Hi, my name is Alicia Savar from Breccia Digital, and in this short video, we are going to talk about common noise and the noise, why we have to stop them and how we do that. So let us look at differential mode. Current first. We are used to dealing with differential outcomes because that is what we study from a school level physics up to university. And it's the standard type of current that basically flows in that way and comes back this way. For example, a power supply, let's say, for simplicity a buck converter what you have here as you can see, a current that is going in that looks like so it's going in on the line and on the return, you would look the opposite. I mean, I used to dealing with it all the time. The problem with power supplies in particular is that these edges are extremely sharp. And when you have very sharp edges, you have got very high harmonic content. And this could cause an enormous amount of problems. And that's why various regulations, in particular European Union's E.M.S. directive, stops us from having such amount of harmonics. And we'll have to filter that. So a standard way of filtering a current differential mode current is with a differential mode filter whereby you have got a standard filter like so. And we're going to talk about this in a different video. The next type of courage that we've got is that common mode current. Now, that's one is a little harder to visualize, mainly because we don't really talk about it very much at a school or university. You only come to realize it afterwards when you start dealing with designing electronic circuitry. Now, imagine that I have got the same buck converter for simplicity. Let's say that I have sold it 150 Piko ferad capacitor between the body of the buck converter down to the chassis of the product. So I've got a little bit of capacitance between the buck converter and the chassis. I call this protective earth. Now, imagine I get a mobile phone and I put my mobile phone on top of the two cables going in to the power supply. So both line and return. The radiated emissions from the mobile phone will couple with these two cables and will flow through this capacitor and back down to protective earth. If your frequency, which was coupling into this was, let's say, 150 kilohertz, the impedance of this will be quite large. If it's about 30 megahertz, which is top of the conductor emission band. The impedance of this will be not that big. It will be probably around 100 ohms. And that means of currents can flow in both in the same direction down these to go down in the following path. So you can go straight here, through here. And a second one down here, through here. And it's like so. OK, and these are common mode currents, the currents that couple via some capacitance between the body and the chassis and then return. The problem with this is that this loop is actually much larger and therefore it may have conducted and emissions tests. Now, I gave an example of a mobile phone coupling with a two lines. It doesn't necessarily have to be that in reality, inside of the converter, you have got to switch. The switch is turning on and off at a very high rate. So you've got Heidt and high def. So consider now that the switch inside of the converter is turning on and off and that is the noise that is coupling with these lines. Nothing changes. You still have noise. And imagine that instead of the 50 Peckford capacitor that I had sold it onto the board in order to demonstrate earlier on, you now have got a plate here. You've got another plate underneath and in between you've got an insulator. Let's call that a dielectric. So you still have some amount of capacitors. And exactly the same thing happens. The high and the high DADT that is inside of the power supply will couple through this capacitor and then you end up in again, currents flowing in exactly the same way. Like so like so. And these are common currents. And of course, again, because of regulations, we have to stop these. Otherwise we cannot sell our product. And we do that with a common mode filter, which again, we will discuss in another video.



